



**UNITED STATES DEPARTMENT OF COMMERCE  
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/263,163	03/05/99	SLATER	J NOMA-110

001362 PM82/0327  
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EXAMINER

NGUYEN, T

ART UNIT PAPER NUMBER

3661

DATE MAILED: 03/27/01

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

# Office Action Summary

Application No.

09/263,163

Applicant(s)

Slater et al

Examiner

Thu Nguyen

Group Art Unit

3661



☒ Responsive to communication(s) filed on Feb 2, 2001

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire three month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

## Disposition of Claims

☒ Claim(s) 26-31 is/are pending in the application.

Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 26-28 is/are rejected.

☒ Claim(s) 29-31 is/are objected to.

☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 5 & 7

☐ Interview Summary, PTO-413

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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## **DETAILED ACTION**

### ***Specification***

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 250 words. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract of the present application contains "means" and "disclosed", which should not be used in an abstract.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to

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make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 26-31 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claim 26, line 11, the limitation "force torque vector" is not reasonably described in the specification. In the specification page 10, line 10, the force torque input vector  $m_d$  is mentioned. However, the force torque input vector is not reasonably defined or described. How can a vector contains two different quantities (the force is equal to acceleration \* weight, whereas the torque is calculated as the force \* distance from a point to the pivot)? What are the component of vector  $m_d$ ?

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wada et al ("Omnidirectional Holonomic Mobile Robot Using Nonholonomic Wheels", IEEE 1995) in view

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of Feng et al ("Sensors and Methods for Autonomous Mobile Robot Positioning", The University of Michigan, "Where am I", volume III, December, 1994) and further in view of Nagaoka et al (U.S Patent No. 4,967,869).

As per claim 26, Wada et al discloses a mobile base movable relative to a surface. The base comprises: a main housing (a vehicle or a robot) (abstract); at least two caster wheels mounted to the housing (page 447, first column, section 2, third paragraph; page 448, second column, section 3.1 "Modeling the two wheeled vehicle"); driving means and steering means (page 448, second column, section 2.2, third paragraph); a controller means (page 450, fig.6; 2nd column, last paragraph). Wada et al does not explicitly disclose a host computer which generates an input vector. However, Wada et al discloses including an input vector (page 450, 1st. Paragraph, section 3.2) and a control system that includes a memory (fig.6). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to include a host computer in order to access the memory of the system of Wada et al and to calculate an input vector for controlling the wheels.

Wada et al does not discloses using force control and calculating a desired torque for each steering and rotation axis. However, Feng et al discloses using force control and using independent motors for controlling steering and drive wheels separately (page 21, last paragraph). And Nagaoka et al discloses distributing torque control for a base with a plurality of wheels (col.2, lines 10-20). Further, trying to provide output torque vector which is as the input vector would have been obvious to a person of ordinary skill in the art in order to move the base as

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close to the path the user selects as possible. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the force input vector of Feng et al and to distribute torque control to each steering and driving wheels as taught by Nagaoka et al. The motivation for this would have been to reduce the wheel slippage as motivated by Feng et al in page 21, last paragraph.

As per claim 27, Nagaoka et al discloses including a dynamic model such that a controller compensates for undesired motion of the base (col.1, lines 12-27).

As per claim 28, Wada et al discloses an input vector which is defined by a kinematic relationship (page 447, section 2.1; page 448, section 2.2).

***Allowable Subject Matter***

6. Claims 29-31 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 1<sup>st</sup> paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

***Prior Arts or Record***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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Rui et al ("Stabilization and Asymptotic Path Tracking of a Rolling Disk", IEEE 1995) discloses torque input vector and a method for preventing wheel's slippage.

**Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks

Washington, D.C. 20231

**or faxed to:**

(703) 305-7687, (for formal communications intended for entry)

**Or:**

(703) 305-7687 (for informal or draft communications, please label

"PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park V, 2451 Crystal Drive, Arlington, VA., Seventh Floor (Receptionist).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thu Nguyen whose telephone number is (703) 306-9130. The examiner can normally be reached on Monday-Thursday from 8:00 am to 4:00 pm ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Cuchlinski, can be reached on (703) 308-3873. The fax phone number for this Group is (703)305-7687 .

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703)308-1111.

TVN

March 21, 2001



WILLIAM A. CUCHLINSKI, JR.  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 3600